

APPLICATION FOR  
UNITED STATES LETTERS PATENT

of

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for

INFANT MOBILE HAVING MULTIPLE ACTIVATION MODES,  
INCLUDING A KICK-BAR ACTIVATION MODE AND  
A REMOTE ACTIVATION MODE

Attorney Docket No.: BEU/Greenberg

10092896.030802

INFANT MOBILE HAVING MULTIPLE ACTIVATION MODES,  
INCLUDING A KICK-BAR ACTIVATION MODE AND  
A REMOTE ACTIVATION MODE

BACKGROUND OF THE INVENTION

5 1. Field of the Invention

This invention relates generally to infant mobiles and, more particularly, to an infant mobile that may be remotely activated by a kick-bar.

2. Description of Related Art

10 The related art may be divided into four categories:

- a. infant mobiles with conventional wind-up or switch activation;
- b. conventional crib gyms or activity centers;
- c. crib toys of various types, including crib gyms  
15 and mobiles, that may be remotely controlled by a parent; and
- d. crib gyms or activity centers with kick-bars.

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The present invention is a combination of categories c. and d., namely a mobile that is remotely controlled by a kick-bar, thus enabling the mobile to be controlled not only by the parent, but also by the infant.

5           The theory behind the kick-bar is that even an infant that is not able to intentionally manipulate objects, or even to move body parts in a controlled manner, may benefit from linking an effect, such as playing of music or activation of a light, to a random action on the part of  
10 the infant. The idea is that if the effect occurs often enough in response to the action, the infant will begin to associate the effect with the action, and thus begin the process of actively engaging his or her surroundings. Since all infants kick from the moment of birth, the kick-  
15 bar is an ideal way to elicit input from even the youngest infant.

Until now, however, kick-bars have not been used in connection with mobiles. To the contrary, mobiles are generally suspended out of reach of the infant and, unlike  
20 a crib gym or activity center, are intended to be passively viewed rather than touched or manipulated. While remote controls have been used in connection with infant mobiles, the remote controls are designed to be activated by a parent from a distance rather than by the infant, so as to

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enable activation of the mobile without the infant being aware of the parent's presence.

By way of background, examples of typical, non-remotely actuated mobiles designed to be suspended out of reach of the infant and activated only by the parent are found in U.S. Patent Nos. 3,919,795 and 5,951,360; examples of standard crib activity centers designed to be hung within reach of the infant, to include sound and/or motion effects, and to be manipulated by an older infant capable of sitting up and actively manipulated objects, are found in U.S. Patent Nos. 4,973,286 and 4,551,114; and an example of a floor or crib gym which includes hanging objects designed to be grasped or batted by an infant lying on its back, and which may also include motion, sound, and/or lighting effects, is disclosed in U.S. Patent No. 5,478,268.

An early example of a mechanical crib toy activated by an infant kick board is disclosed in U.S. Patent No. 2,461,682 discloses a mechanical crib toy activated by an infant kick board, while more contemporary kick board activated crib activity centers with lights and sound are disclosed in U.S. Patent Nos. 6,203,395 and D450,782.

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On the other hand, U.S. Patent Nos. 4,207,696 and 4,640,034 disclose sound-activated mobiles, while U.S. Patent No. 4,984,380 discloses an infant mobile that is activated in response to body motion of an infant detected  
5 by a passive infrared sensor. These systems offer a certain degree of interactivity, but lack the tactile input of a kick-bar, and do not enable an infant to associate specific motions with motion of the mobile.

The present invention combines the concept of the  
10 kicking unit, which has heretofore only been used with gym-type crib toys, with the infant mobile, creating a new category of crib toy that bridges the gap between more passive mobiles of the type taught in U.S. Patent No. 4,984,380 and more interactive crib toys of the type taught  
15 be U.S. Patent No. 6,203,395.

#### SUMMARY OF THE INVENTION

It is accordingly a first objective of the invention to provide an infant mobile that not only stimulates the visual and aural senses of the infant, but that also  
20 permits the infant to activate the mobile, thereby enhancing the developmental effects of the mobile.

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It is a second objective of the invention to provide a mobile that is responsive to two sources of activation, namely the parent and the infant.

It is a third objective of the invention to provide a  
5 remotely controlled infant mobile that includes a second remote actuator designed to elicit specific movements by the infant.

It is a fourth objective of the invention to provide a remote activation device that enables a pre-mobile infant  
10 to activate a device suspended out of reach of the infant.

It is a fifth objective of the invention to provide a crib toy having passive and interactive activation modes, and that has a relatively simple construction.

It is a sixth objective of the invention to provide a  
15 remote control device that is capable of causing an effect to occur in response to an action by an infant who is not yet able to manipulate objects or intentionally move body parts, and thereby accelerate development of the ability to intentionally move objects and manipulate objects.

20 It is a seventh objective of the invention to provide an infant mobile that may be activated by the infant and

yet that allows the parent to control the degree of stimulation provided the child, and in particular to time the activation and shut-off in such a way as to lull the infant to sleep, without the infant being awakened as the parent manipulates the activation or shut-off mechanism.

These objectives are achieved, in accordance with the principles of a preferred embodiment of the invention, by adding a transmitter to a kicking unit of the type disclosed in U.S. Patent No. 6,203,395, so that the kicking unit can activate a mobile or other device by remote control.

Preferably, the mobile consists of three units: a kicking unit including a kick-bar, a mobile unit, and a remote control unit designed to permit parental activation of the mobile. The kicking unit is attached to the inside of the crib, includes electronic light and sound effects, and serves as a first remote control unit for the mobile. It can be made from soft vinyl, foam, plush or hard plastic, and is intended for the infant to kick. The mobile unit is attached to the top of the crib's rail and has four to five dangling characters attached to it, although those skilled in the art will appreciate that the number and design of the characters may be varied in any way that is likely to be attractive to an infant. The

remote control unit is intended to provide a second means of remotely activating the mobile, and in particular to permit a parent to switch the electronics in the kicking unit on and off, and is preferably stored in a bracket,  
5 attached to the wall by the door.

The kicking unit may be designed to provide two modes of operation. When set to a lights and sound setting, the lights and sounds are activated in response to kicking of kick-bar, but the mobile is not. When the toy is set to a  
10 mobile setting, the baby kicks the kicking unit, the lights and sounds are activated and, in addition, the kicking unit send a wireless signal to the mobile to spin it above the infant's head. Either operation mode can be turned on or off using the second remote control.

15 In addition, the kicking unit may be arranged to activate a projector that display shapes on the ceiling, and/or may include a cassette CD with appropriate music to accompany projected images or movement of the mobile.

#### BRIEF DESCRIPTION OF THE DRAWINGS

20 Fig. 1 is a perspective view showing a foot-operated mobile constructed in accordance with the principles of a preferred embodiment of the invention.



Fig. 2 is an exploded isometric view of a kicking unit for use in the preferred embodiment.

Fig. 3 is an exploded isometric view of a mobile unit for use in the preferred embodiment.

5 Fig. 4 is an exploded isometric view of a remote control unit for use in the preferred embodiment.

#### DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

As illustrated in Figs. 1-4, the toy of the invention is a foot-operated mobile that consists of a three units:  
10 a kicking unit; a mobile unit; and a remote control unit.

The kicking unit may be made from soft vinyl, foam, plush or hard plastic, and includes a front housing 1, a rear housing 2, and a kick plate 3. Kick plate 3 is movably positioned within an opening<sup>50</sup> and suspended from  
15 springs 42 that enable the kick-bar to be pushed inwardly in response to a kick from an infant, and to return to an original position following the kick. Movement of the kick plate is detected by a button switch 51, which is connected to a printed circuit board 11. Printed circuit board 11 is  
20 also connected to an infrared emitter 52 which emits an

infrared signal in response to activation of button switch  
51 upon kicking of the kick plate, and to an infrared  
receiver 59, a speaker 53, lights 54, on/off switch 55, and  
battery terminals 46. Speaker 53 and lights 54 are  
5 illuminated in response to kicking of the kick plate.

Those skilled in the art will appreciate that the  
circuitry on printed circuit board 11 is conventional and  
well within the capabilities of those skilled in the art  
since it simply involves causing the infrared emitter,  
10 sound generator, and lights to be activated upon receipt of  
a signal from switch 51, which is how most infant musical  
toys operate.

Power to the circuit board is supplied via terminals  
46 and conventional batteries <sup>47</sup>~~46~~, which are housed in a AA  
15 battery compartment shut by a door 9 and screw 44, again in  
conventional fashion. To enhance the lighting effect,  
colored lenses 5-7 are fitted into corresponding openings  
56-58 in front housing 1 and supported by reflector 8  
through which lights 54 are fitted. Finally, a strap <sup>10</sup>~~is~~ AA  
20 included to secure the kick plate unit to a crib railing or  
other structure within reach of an infant.

As indicated above, in addition to mobile activation  
functions, the kicking unit may be arranged to activate a

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*displays*  
projector that ~~display~~ shapes on the ceiling, and/or may  
include a cassette CD with appropriate music to accompany  
projected images or movement of the mobile.

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5 The mobile unit includes a mobile arm upper housing 12  
and a ~~lower~~ <sup>mobile</sup> arm ~~upper~~ <sup>lower</sup> housing <sup>13</sup> arranged to support a  
rotating sphere consisting of a sphere upper housing 16 and  
sphere lower housing 17. The mobile arm also includes a  
circuit board 36 connected to an infrared receiver 60,  
motor 61, and battery terminals 45, which in turn are  
10 connected to batteries 47 <sup>housed</sup> ~~housing~~ in a compartment 63  
closed by a cover 35 and screw 44. The mobile arm is  
secured to a crib in conventional fashion by means of a  
clamp screw 14 that extends through an opening 64 in upper  
housing 12, <sup>and that</sup> is threaded into a clamp plate 15.

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15 The mechanism for rotating the mobile in response to  
rotation of the motor is conventional and includes a  
gearbox 31 containing gears (not shown), and a pivot shaft  
34 with a built-in clutch. Extending from the sphere are  
four hang arms 4, from which are suspended various objects  
20 which each consist of respective housing member pairs  
19,20, 21,22, 25,26, and 23,24, and inserts 27-30. The  
materials, colors, shapes, and construction of the objects  
may of course be varied in numerous ways without departing  
from the scope of the invention.

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Finally, the remote control unit includes front and rear housing members 38,39, which when assembled together form a portable remote control unit housing that can be held in the hand of the user. The remote control unit also includes a circuit board 41 connected to an infrared transmitter 65, a push button switch 66, and on/off switch 67, and battery terminals 45 arranged to contact batteries 47 housed in a battery compartment <sup>68</sup>~~67~~ and closed by a cover 40. A push button 18 engages the switch 66 to activate the transmitter 65 in order to activate and de-activate various features in the kicking unit, as described below. AA

The operation of the various units is as follows:

When a baby kicks the kicking plate 3, the unit will play a song through speaker 53 without interruption, with lights 54 activated in sequence until the song is over. The first kick also causes infrared transmitter 52 to send a signal to the mobile unit to turn on the motor, which slowly spins the dangling objects for a few seconds, at which time the spinning stops while the music continues to play. If the infant kicks plate 3 again, however, spinning resumes for another few seconds and then stops while the music continues to play. Every time the infant kicks the plate 3, spinning resumes for a short period. When the song is completed, the infant needs to kick the plate again to start a new song.

On the other hand, when a command is received from the remote control unit through infrared receiver 59, the unit will play a plurality of songs one time with continuous blinking of the lights and spinning of the mobile until all  
5 songs are finished. If no valid command is sent to the unit within one minute after the songs stop playing, the unit will go into stand-by mode.

When the mobile unit receives a command from the kicking unit or remote control unit, the motor will be  
10 turned on or off depending on the command received. If it receives the on command from the kicking unit, the dangling objects will spin slowly for approximately one revolution and then stop. Another on command generated by a kick is required to originate another spinning action. If the  
15 kicking unit receives the on command from the remote control, the mobile spins until all songs are finished. If no valid infrared command is received within one minute after the motor stops, the unit will go to standby mode.

It will be noted that the signals from the kicking  
20 unit and remote control unit are different. This may be achieved in conventional fashion by varying the coding of pulse-modulated infrared signals, by frequency or amplitude shift keying of the signals, or by any other conventional

means. In addition, the infrared signals may be replaced by radio frequency signals.

When the on/off switch on the remote control unit is activated, the power to the kicking and mobile units is either turned on or off. When turned on, the lights blink in sequence, a short chime sounds, and the mobile makes one revolution to catch the child's interest and confirm to the parent that the unit is on. Both units are then put in stand by mode so that the child can interact with the toy and by kicking turn on the lights and sound and the mobile motion. When turned off, both units are turned off, overriding any commands generated by the infant. Finally, when button 18 is pressed, both the kicking and mobile units play in a continuous mode, as described above.

Having thus described a preferred embodiment of the invention in sufficient detail to enable those skilled in the art to make and use the invention, it will nevertheless be appreciated that numerous variations and modifications of the illustrated embodiment may be made without departing from the spirit of the invention, and it is therefore intended that the invention not be limited by the above description or accompanying drawings, but that it be defined solely in accordance with the appended claims.